Washington, D. C., July 31, 1920, No. 84

COPEIA

Published to advance the Science of cold-blooded vertebrates

ABSTRACT OF THE PROCEEDINGS OF THE WASHINGTON MEETING OF THE AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS

The fifth annual meeting of the American Society of Ichthyologists and Herpetologists was held in Room 43, U. S. National Museum, Washington, D. C., on Friday, May 14, 1920.

The business meeting was called to order at 9:30 A. M., President Stejneger in the chair. Present: Barbour, Dunn, Engelhardt, Fowler, Noble, Radcliffe, Richmond, Stejneger, Stone and Thompson.

In the absence of Mr. J. T. Nichols, the chair appointed Mr. Noble acting secretary for the meeting.

The minutes of the preceeding meeting were read and approved.

A unanimous vote was cast for the re-election of the officers of the previous year.

The following, having been selected by the mail vote of the Board of Governors, were elected into the Society.

(1) Bailey, Vernon
(2) Goldman, E. A.
(3) Preble, E. A.
(4) Jackson, H. H. T.
(5) Nelson, E. W.
(6) Taylor, W. P.
} Biol. Survey.

(7) Bean, B. A.
(8) Bartsch, Paul
(9) Clark, Austin H.
(10) Riley, J. H.
} U. S. Nat. Museum.

The following new members were proposed and elected:

(1) Smith, Dr. Hugh M., U. S. Bureau of Fisheries.
(2) Palmer, Wm., U. S. Nat. Museum.
(3) Cochran, Doris M., U. S. Nat. Museum.
(4) Hollister, Ned, National Zoological Park.
(5) Patch, Clyde, Ottawa, Ontario.

The report of the Treasurer was read and approved. It was voted that it be accepted without auditing.

The resignations of the following members were read and accepted under the usual conditions:

(1) Coker, Dr. R. E.
(2) Givler, Dr. J. P.
(3) Paine, R. G.
(4) Redfield, A. C.
(5) Schneider, Dr. Frederick
(6) Townsend, Dr. C. H.
(7) Tucker, Dr. Henry

The names of members in arrears with their dues were read by the Treasurer.

Notice of the deaths of Mr. Brewster and Dr. Eastman was read by the Treasurer.

A vote of thanks to the Museum authorities for their courtesies extended to the Society was cast.

A motion was made that the abstracts of papers read at the meeting be published in *Copeia*. Amended

that a Committee of the Secretary, the Treasurer and a third person nominated by them should prepare the Abstracts of the meeting. Motion and amendment passed.

Business meeting temporarily adjourned for the reading of the papers indicated in the program.

Business meeting convened again at 3 P. M., President Stejneger in the chair.

It was moved that the secretary be empowered to cast a ballot to elect:

(1) Huntsman, A. G., University of Toronto, Toronto, Ontario.
(2) Crawford, D. R., U. S. Bureau of Fisheries, Washington, D. C.
(3) Hay, O. P., Carnegie Institution, Washington, D. C.

The following members were elected to the Board of Governors:

(1) Smith, Dr. Hugh M.
(2) Gaige, Mrs. H. T.
(3) Thompson, Miss C.
(4) Bean, Dr. B. A.

It was moved that the Secretary accept Mr. Fowler's invitation to have the next meeting of the Society at Philadelphia, the time of meeting being left to the Secretary and Treasurer.

A vote of thanks to Dr. Richmond as Chairman of the Local Committee was passed.

Meeting adjourned at 3:30 P. M.

G. K. NOBLE,
Acting Secretary.

LIST OF PAPERS READ

1. The Aquarium at Miami, Florida. Thomas Barbour.

2. Herpetological Notes from Florida. Thomas Barbour.
3. Some By-products of the Fisheries. Lewis Radcliffe.
4. Notes on the Scale Examination of Certain Fishes. W. W. Welsh.
5. Cyclura in Santo Domingo. L. Stejneger.
6. Phylogeny of Carangin Fishes. John T. Nichols (Read by Dr. Barbour).
7. Some Remarks on a Collecting Trip to the Chiricahua Mountains, Arizona. Illustrated with lantern slides. Witmer Stone.
8. Some Fresh-water Fishes of Eastern Pennsylvania and New Jersey. Illustrated with lantern slides. Henry W. Fowler.
9. The Genetic Relations of the Salientia. Illustrated with lantern slides. G. K. Noble.
10. The Correlation of Lunglessness in Salamanders with a Mountain-Brook Habitat. Inez W. Wilder and E. R. Dunn.
11. Exhibition of a specimen of *Hyla lichenata.* Crystal Thompson.

THE AQUARIUM AT MIAMI

The Aquarium and Biological Station are situated on the west side of Miami Beach overlooking Biscayne Bay, and within one mile of the main channel, one hundred feet from the Causeway that connects the Beach with the City. The latitude of the Station is practically 25 degrees 46 minutes N. and the longitude 80 degrees 07 minutes W. The nearest Bahama Island is only forty-five miles away and between these positions the entire output of the Gulf of Mexico passes at sometime in the year. The axis of the Gulf Stream is about twelve miles from the station. Its edge cuts the shores of Florida. The temperature of the sea never goes below 63 degrees F. in winter and reaches 85 degrees F. in summer. Economic interest will be served by investigation of the migration of

food fishes, the fishing grounds, the character of the bottom and its animal life. The further objects of the station will be to maintain a large public aquarium and to carry on investigation of the most practical methods of artificial culture of the Spiny Lobster and the Stone Crab as well as the important food fishes; to furnish working laboratories and material for investigators in biology and ample aquaria for observation and to furnish living and preserved marine material to aquariums, museums and other scientific institutions. The Station will secure the best possible library for the use of investigators. An admission fee will be charged at the Aquarium to help in its maintenance. Mr. L. L. Mowbray, the well-known aquarist, is the Technical Director.

THOMAS BARBOUR,
Cambridge, Mass.

HERPETOLOGICAL NOTES FROM FLORIDA

It is a little difficult for me to give an abstract of the short paper which I presented with this general title, for I spoke largely from memory and entirely informally. The observations have been made mostly during several winters at Palm Beach with much collecting elsewhere in Florida intermittently since 1899.

The subjects touched on were the burrowing habits of *Siren* which has been observed to burrow like a mole in the ooze about the shores of drying-up prairie ponds.

Rana aesopus was discussed with the relation to dispersal and its habit of feeding on the small oak toad, *Bufo quercicus*.

Rana grylio reappeared in 1920 on March 17th after not being seen all winter. It is very shy and wholly aquatic. Its call, which is heard at night, or on damp days, resembles the grunting of a pig, and consists of but one sound oft repeated.

Rana sphenocephala, when alarmed while resting on a bank of a stream, or pond, usually turns about and escapes inland with leaping bounds, evidently more afraid of enemies in the water than on the land.

Eleutherodactylus ricordii, a West Indian species which has only been known from Florida for a few years, is becoming abundant and widespread.

A crocodile was caught in March 1920 three miles north of Palm Beach in Lake Worth. This is the most northerly record for the crocodile except for the report that one was killed in Jupiter Sound about twenty years ago.

Sphaerodactylus notatus described from the city of Key West, later found to be widespread in Cuba and the Bahamas, is now found to occur generally in the Florida Keys and on the southern tip of the mainland as well.

Sceloporus woodi was not found in the black-jack oak scrub about Eau Gallie, but passing southward from that point it appeared with the first area of spruce-pine scrub which is at Valkaria. It is found southward along the coastal zone everywhere that spruce-pines occur as far south as Hallendale below which point there is no scrub.

Ophisaurus is much more abundant than is usually apparent. On one day, after an excessively heavy rain, twenty were seen which had been killed by motorcars on the Dixie Highway within the eight miles between Prairie Siding and Jupiter.

Heterodon browni was described from Lemon City and it is evidently one of those types which is confined to the southern typically tropical portion of the state, because the specimens from Palm Beach, only sixty miles north, are true *H. contortrix.* The southerly range of *H. browni* was extended to Homestead.

Lampropeltis getulus brooksi has an even more southerly distribution. An additional specimen of this rare form was secured but, unfortunately, escaped.

A few specimens of *Liodytes alleni* were secured all at exactly the same spot. They were found sunning themselves in the road where the Okeechobee Road runs past a small pond about two miles back of West Palm Beach. No examples ever were observed in hundreds of other similar situations where they might have been expected to occur. The species is very rare and local.

Sacken's garter snake is arboreal and almost always found in trees or bushes overhanging the water.

A large individual of *Crotalus admanteus* was found to have recently swallowed a king rail, which fact is interesting, since the species usually feeds on mammals.

The young of *Kinosternon baurii* were found for the first time amongst floating water lettuce in the Colohatchee River. They are extremely brightly colored.

Chelydra osceola was found to occur as far south as Homestead below which there is no fresh water.

Deirochelys reticularia in life strongly shows its generic distinctness from the species of *Pseudemys*. It is vicious, untameable and sluggish, fond of lying on the bank with its long neck and elongate head stretched out to the fullest extent after the manner of *Trionyx*.

THOMAS BARBOUR,
Cambridge, Mass.

THE PHYLOGENY OF CARANGIN FISHES

It is safe to assume that Carangin fishes are derived from some percoid stem by adaptation to a free-swimming, predaceous habit. The central, and we may assume, the primitive Carangin is a rather large fish, rather elongate, symmetrical, moderately compressed in body. Its tail and caudal fin are of the Scombroid type. The posterior portion of its lateral line and the peduncle are strengthened and armed laterally with

enlarged, keeled scutes; elsewhere, scales are reduced and smooth, but present over the entire body. Probably *Caranx latus* is nearest to the original form.

The development of the characteristic peduncular scutes was probably coincident with reduction of scales over the remainder of the body, corollary to the free swimming habit which centralized the motion of the body at the peduncle, and called for lateral strengthening of the narrow base of the powerful forked caudal. The defensive value of the sharp-spined keel formed by these scutes was of secondary importance. Development of scutes throughout the entire length of the lateral line which we find in *Trachurus* seems not to be primitive, but a secondary adaptation to re-extension of the body-motion forward.

From the condition in other groups, we know that such predaceous, free-swimming animals tend to become adapted for utilization of smaller and smaller food, keeping or increasing their activity and wide-ranging habit, but losing their predaceous nature. Examples are the Herrings among Isospondyles, the Basking Shark, a specialization of the Lamnoid type, as are the Whalebone whales from the Delphinidæ, and certain Mackerel from the Orient with long, fine gill-rakers for sifting food from the water. No striking development of this sort has yet evolved in the Carangins, but we find a decided trend in that direction through the genus *Decapterus,* which swims in large schools. The reduction of the scutes which we find in *Decapterus* is probably related to their small size, and the elongate, more cigar-shaped bodies which they have acquired. I would consider *Decapterus* the Carangin specialization in the most direct line of the evolutionary development of the sub-family.

Another line of specialization, more or less in the opposite direction, is that which leads to the Moonfishes and carries the Carangins to the most specialized forms. In these forms, the body becomes deeper and deeper and more compressed; the mouth smaller, and dentition weaker, which changes are accompanied

by a loss of activity. The Moonfishes probably represent the persistence of larval forms adapted to distribution by drifting widely in ocean currents. At any rate, we find that in these fishes the young are notably more specialized and less like the original *Caranx* stem than the adults are.

Reduction of dentition and of scales, including the scutes, are lines of specialization which occur throughout the group, and we find these tendencies carried to an extreme in the Moonfishes. The division of the more generalized Carangins into two large genera, *Caranx,* and *Carangoides* which has teeth in villiform bands, is based upon these two tendencies. *Carangoides* frequently has the pectoral region scaleless.

Correlation of Structure and Habit in Carangins.

To obtain some idea of the correlation of structure and habit in Carangin fishes, we may select a typical species and compare its structures, point by point, with those of some more generalized fish resembling its probable ancestor. In this way we shall compare *Caranx crysos* with the Perch.

The most notable characteristic of *Caranx* is the unusually firm, deeply-forked caudal fin, subtended by a narrow, compact peduncle. This style of locomotor apparatus is doubtless correlated with continuous swimming through extensive stretches of sea. We find it approached by all active fishes of open waters. It is interesting to note in this connection that the mammalian cetacea have a very similar caudal apparatus, except that their fin is in a plane at right angles to that of the fish. The narrowing of the peduncle in the plane of the fin and its firm keel-like form in the plane of the fin's motion, seem corollary to the forked caudal fin. The advantage in such an arrangement seems to be that the lobes of the forked tail get a better purchase on the stationary water, away from the fish's sides, than they would closer in, where the water displaced by the movement of the fish, moves backward, forming an inverted cone behind the axis of its body.

By the simple experiment of towing a log, butt first, as opposed to small end first, the advantage of the body ending in a tapering point may be demonstrated.

Another striking difference between Perch and *Caranx* is the reduction of scales in the latter. To understand the significance of this reduction we shall turn to the value of scales as such. They doubtless combine, to a very high degree, elasticity with firmness. Since *Caranx* swims much more continuously than the Perch, the factor of friction of its outer covering against the water doubtless is an important one, and general reduction in size and increased smoothness of scales may be considered as an adaptation to this habit. Its method of swimming is somewhat different from that of the Perch, or other less specialized fishes. It glides forward more directly being propelled by the steady, rhythmical motion of the posterior part of the body. Therefore, the need for the firm, elastic, over-lapping scales is more local, and in response to this need, we find the scales highly developed in the scutes along the posterior part of the lateral line. The keely armature of these scutes may be a defensive adaptation, since it is from the flank that the fish is most apt to be attacked by other predaceous fishes; but this hypothesis is not entirely convincing, and perhaps the keels are merely a specialization which strengthens the scutes and makes them more serviceable as organs of elasticity.

The course of the lateral line is characteristic in *Caranx,* an abrupt anterior curve being followed by a very straight portion posteriorly. This condition is correlated to development of the scutes on the posterior straight portion. We find it less marked in those species with reduced scutes.

The small, spinous dorsal fin, more or less depressible in a slot, soft vertical fins more or less high in front, but low posteriorly, where they correspond to the feathering on an arrow, with a fish gliding forward through water, are doubtlessly correlated to the con-

tinuous swimming of *Caranx*. The long, falcate pectoral fin probably has special use which must be determined by more careful study of the fish in life, though a possible explanation has been touched on in a later paragraph. We find it in certain of such active, free-swimming forms, as, for instance, *Caranx* and Albacore, but it is notably absent in related Pilotfish and Mackerel. These are the principal characteristics of *Caranx* which hold the attention.

General form, mouth, eye, et cetera, are variable among different species and correspond more or less with structures of the Perch and other more generalized fishes.

The colors of *Caranx* are characteristic, greenish or bluish above to match the water, silvery on the side, and white below, with yellow posteriorly. The value of this color-scheme is, in the main, concealing, and adapted to the bright light of the open water. The posterior yellow, on the other hand, probably has a directive significance related to the fish's schooling habits.

Let us now compare *Caranx* with one of its not distant relatives of similar habit,—that is, *Seriola* and the Pilotfish *(Naucrates)*.

The difference which is at once apparent is the absence of scutes on the posterior part of the lateral line. One way of explaining this fact is by supposing that *Seriola* arose from small-scaled, Perch-like fishes, such as the Groupers and Rockfish, and that, therefore, scutes were not so readily developed; whereas *Caranx* arose from larger-scaled species. This explanation is not satisfactory, since for one reason, it implies a greater separation of these two similar types than is probable. It will also be noted that the Scombridæ have no indication of peduncular scutes, whereas, in many of them scales of the anterior portion of the body are enlarged and fused into a solid corslet, though very small, or absent elsewhere. In these fishes, the place of scutes is taken by a ligamentous elastic keel on the peduncle. It will be noted that, as

a rule, they are more off-shore in their distribution than *Caranx* and probably wider and swifter swimmers. The probabilities are that, in swimming, the caudal fin is moved from side to side with so great rapidity that this ligamentous keel is more advantageous than the scutes of *Caranx*.

It remains to compare, in a general way, the various types of Carangins. These vary from elongate, cigar-shaped species to those very deep and compressed. All have forked tail and narrow peduncle, but there is much variation in the scutes, which tend to be restricted to the actual peduncle rather than to cover the entire posterior straight portion of the lateral line.

Probably in those species in which the scutes are confined to the peduncle, the propelling motion is also thus confined, the fish's body gliding forward rather rigidly. Similarly, in *Trachuras*, where the scutes extend over the anterior portion of the lateral line as well, there is probably a considerable motion of the same, the fish weaving forward through the water, and we would look for a resemblance between the method of swimming in *Trachuras* and in the Herring, whose entire body is covered with large scales. The deep, compressed forms have the body-scales much reduced, while the scutes also are reduced or absent, in the deepest ones. Probably none of these fish are rapid swimmers and do not have great latitude of motion in swimming. Thus, they do not need the elasticity of the scutes, whereas their great compression enables the skeleton within to give requisite firmness to the exterior.

The long, sickle-shaped pectoral fin is characteristic of Carangin fishes. It is rather uniformly better developed, and longer in proportion, in the adults than in the young. It will be interesting to determine its function by observations of its use among fishes kept in aquaria. Until this has been done, the most obvious hypothesis is that it functions as a balance, to keep the fish from canting to one side. In small individuals, or in related species which lack it, the same pur-

pose may well be served by the ventrals, which by the way are situated almost directly below the pectorals. The ventrals frequently are greatly reduced in proportional size with age, as the pectorals increase in size. It is not unreasonable to suppose that a larger fish requires the fulcrum of such a balancing fin near the axis of the body, and that a shift of function from ventral to pectoral is correlated with this shift. Granted that the sickle-shaped pectorals function as balances, their length would, of course, increas their efficiency. When they are held away from the body, their shape causes a considerable length of their tips to lie opposite the middle of the side and more or less parallel with it. While the body is held upright, this position will cause equal pressure, instead of increasing pressure to be exerted by this length of tip distally against the water, and it will translate to the fulcrum of the fin a force which might otherwise merely bend it at the end. When the fish is swimming forward rapidly the normal position of the pectorals is, of course, pressed against the side.

J. T. Nichols,
New York, N. Y.

THE CORRELATION OF LUNGLESSNESS IN SALAMANDERS WITH A MOUNTAIN BROOK HABITAT

In a paper on the "Ypsiloid Apparatus of Urodeles" (Whipple, 1906), the theory was advanced that lungs of salamanders serve mainly as hydrostatic organs, their function as breathing organs being of secondary importance; and that the ypsiloid apparatus has developed to aid in a nice adjustment of the position of the body in the water. Thus in a thoroughly aquatic lunged form like *Triturus* (Diemictylus) *viridescens* this apparatus becomes a mechanism of great delicacy of adjustment, while in the lungless family, Plethodontidæ, including the Desmognathidæ, the ypsiloid apparatus is absent.

Obviously, however, it is only in water relatively quiet that the hydrostatic apparatus of lunged forms

would be able to function to advantage. In fact, in a current at all rapid, the buoyancy caused by the presence of lungs would be a decided disadvantage, since the animal would find itself swept rapidly down stream, and would be unable thus to maintain its position even though it might habitually swim against the current. Since the lungs become functional as hydrostatic organs before metamorphosis, the larvae would be subjected to the same disadvantages as the adults, with the added handicap of not being able to relieve the situation by going on land. These facts have been put to the test by the writers by actual observations of *Triturus* adults and larvae when placed in a mountain brook of only moderate current.

On the other hand, the advantage of a lungless condition in such a habitat is obvious, which may be demonstrated by observations upon the activities of various Plethodontidæ in the streams in which they lay their eggs and spend their larval and, to a less extent, their adult life. A lungless form sinks to the bottom the moment that it ceases active swimming, and however rapid the current, it usually reaches the bottom before being carried very far down stream. Once at the bottom, the protection from the current afforded by the shelter of the many chance irregularities there, and the resistance presented by contact with solid objects enables the salamander to find his way up stream again, provided there is any directive force turning the animal against the current. Actual experiments with two lungless species, *Desmognathus fusca* and *Eurycea* (Spelerpes) *bislineata,* have shown a decided rheotropism of this nature, in both larvae and adults, although these forms are not strong swimmers.

The query then arises as to whether there is a correlation between lunglessness or reduction of lungs and such a habitat that the only available water would be swiftly flowing, in other words a mountain habitat. All of the Plethodontidæ which have not, like *Autodax,* the Plethodons, and the European *Geotriton* (Spelerpes) *fuscus,* become so completely terrestrial

that there is no aquatic larval life, are well recognized brook dwellers so far as they are aquatic at all. They may, of course, find their way into the ponds and lakes into which the brooks flow, and if these bodies of water are not too deep or extensive, the larvae doubtlessly would be able to reach the shore to undergo metamorphosis. But even where the brook is very short, individuals occur in great numbers in the brook and only occasionally in the pond near the mouth of the brook.

Outside of the lungless family, Plethodontidæ, there are a few species in the family Salamandridæ such as *Salamandrina terdigitata* which is lungless and the Euproctus group with reduced or rudimentary lungs, the habitats of which should throw some light upon this question. *Salamandrina* occurs according to Boulenger 1910, "dans les endroits montueux ou boisés de la Liguerie et des Apennins et s'etend au Sud jusqu'aux environs de Naples. Elle se tient surtout dans le voisinage des sources et des ruisseaux à courant faible, dans lesquels elle n'entre toutefois que pour déposer ses oeufs, ou au moment de la mue; elle évite less eaux stagnantes."

Concerning the Euproctus group Walterstorff 1902 and Boulenger 1917 sum up the state of knowledge regarding four mountain brook inhabiting forms; namely *Triturus* (Euproctus) *asper* from the Pyrenees; *Triturus* (Euproctus) *rusconii* from Sardinia; *Triturus* (Euproctus) *montanus* from Corsica and the recently described *Triturus* (Rhithrotiton) *derjugini* (Nesterov) from Kurdistan.

Regarding the lungs of these four Boulenger, 1917, says: "Les poumons très réduits chez *M. aspera* et *M. rusconi,* ont presque disparu chez *M. montana;*" and "*M. derjugini* manque de poumons développés." The following as to the habits is from the same source: "evitant la lumiére et se cachant sous les pierres des torrents et des sources de montagne entre 1000 m. et 1500 m. d'altitude"; and further, "bien qu'aquatiques à l'époque des amours, les Euproctes à poumons rudimentaires on très réduits, au lieu de nager a la maniere

des Tritons proprement dits, rampent sur le fond ou se cahent sous les pierres de la meme facon que les Salamandres terrestres." "C'est précisement ce qu'a pu observer M. Nesterov chez l'espèce des montagnes de Kurdistan."*

In general, then, the contrast between the habitat of lungless forms, or of forms with reduced lungs, and the habitat of lunged forms is striking, for although the latter may frequent springs and quiet pools along the course of streams, apparently those forms alone which are practically without lungs are at home in mountain torrents. Boulenger, 1917, in discussing the *Euproctus* group states that a mountain habitat leads either to the suppresssion of an equatic larval stage, as in the case of *Salamandra atra;* or to the permanent retention of that stage. As examples of the latter he cites neotonic *Triturus alpestris* and *Triturus wolterstorffi,* but the Axolotl (*Ambystoma tigrinum)* in the Rockies and in Mexico is quite as pertinent and much more famous.

It seems that lunglessness is a third result of mountain life. This correlation of lunglessness with a mountain brook habitat is of far reaching importance in connection with the problem of dispersal, for in the family Plethodontidæ we have a very natural group which is uniformly lungless. It is evident that their center of dispersal must have been a mountain area if the argument given above holds good.

Their present distribution reaches from Bolivia to Southern Europe, with their headquarters in three

---

* In addition, *Chioglossa lusitanica* from the mountains of Portugal and northwest Spain is lungless. A large part of its time is spent on land, but it breeds in the water which it enters in February, and it takes refuge in the water. When in the water, it seeks the bottom and the deepest holes. Bedriaga compares it to an eel in its aquatic agility. *Salamandrina,* in the mountainous and wooded regions of Liguria, and the Appenines, and south to Naples, lives in the neighborhood of springs and brooks which it enters only to deposit eggs. It avoids stagnant waters. *Euproctus* avoids light and lives under stones in streams and springs in the mountains between three thousand and four thousand five hundred feet, above sea level. Aquatic in the breeding season, it climbs on the bottom and hides under stones like terrestrial salamanders instead of swimming like tritons and this habit is exactly what M. Nesterov observed in the case of the Kurdistan species.

mountain areas; (1) the Southern Appalachians; (2) the Rocky Mountains-Sierra complex; (3) the Mexican Table Land.

Gadow 1905 has assigned to the third complex, which he calls Old Sonoraland, the breeding ground of the Plethodontidæ. But this can hardly be, since that region is remarkable for the great development of one group of the family and for the absence of members of other groups. In the same way, the Rocky Mountain region contains members of only two groups. The Appalachians, on the other hand, are far richer in diversity of forms. Also, that region contains all but one of the animals of the family which live in mountain brooks (*Eurycea multiplicata* of the Ozarks and the Rockies, and this one has a close relation in Appalachia and it is evidently a late Pleistocene immigrant into the Rockies).

In Appalachia and its outskirts to the Southeast and Southwest, every group in the family is represented. One group at least, that of *Desmognathus-Leurognathus* can be proved to have spread from Appalachia, (see Dunn 1917).

In taking either the Rockies or the Mexican Table Land as the original home of the family, the absence of animals in the original habitat is inexplicable; but if only terrestrial and secondary forms reached these regions there is no objection to answer.

In short everything points to a prolonged isolation of the Plethodontidæ or their ancestors in Appalachia. Here, at the present day *Desmognathus quadramaculatus,* or *Gyrinophilus porphyriticus* in their habitat and mode of life may well represent for us the ancestral Plethodont. Here the family took on their distinctive characters. From this region two groups, those typified by *Plethodon* and *Eurycea* (Spelerpes), reached the Rockies but as terrestrial not as brook-dwelling forms. The *Eurycea* group reached the Mexican Table Land, underwent extensive development there, and after the Miocene invaded South America. A member of the *Eurycea* group exists at present in Southern Europe, but we are as yet unable

to give any definite statement as to the route by which it came there.

Literature cited.

Boulenger, G. A. Les Batraciens, O. Doin et Fils, Editeurs, Paris, 1910.

Boulenger, G. A. Les Batraciens Urodeles rapportes au genre *Euproctus*. Comptes rendus des Seances de l'Academie des Sciences, 1917.

Dunn, E. R. The Salamanders of the Genera *Desmognathus* and *Leurognathus*. Proc. U. S. National Museum Vol. 53, 1917, pp 393-433.

Gadow, H. The Distribution of Mexican Reptiles and Amphibians. Proc. Zool. Soc. London 1905, No. 2, pp. 191-144.

Whipple, I. L. (Wilder, I. W.) The Ypsiloid Apparatus of Urodeles, Biol. Bull. Vol. X, No. 6, 1906.

Wolterstorff, W. Der Tritonen der Untergattung *Euproctus* Gene. Stuttgart, 1902, 46 pp.

INEZ WHIPPLE WILDER,
Northampton, Mass.

E. R. DUNN,
Cambridge, Mass.

AN ADDITION TO THE AMERICAN CHECK LIST

In 1888 Cope (Proc. U. S. N. M.; 11, p. 388, pl. 36, fig. 3) described *Coluber rosaceus* from Key West, Florida. Probably because no recent specimens had been collected from the Keys, and because of a general predisposition to look askance at Copeian species based upon single specimens, Dr. Stejneger and I omitted this species from the Check List assuming that Cope probably had simply *Elaphe guttata.*

This year my associate, Mr. W. S. Brooks, made a short and fruitful trip to Big Pine Key. He found